Clinical Examination of Hip Dysplasia/Instability

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Introduction by the editor Boris Gojanovic

L'examen clinique est une compétence clinique fondamentale, acquise dans la formation et renforcée par l'expérience clinique, et son apport au diagnostic est essentiel en appoint à l'anamnèse. Mike Reiman est un physiothérapeute de Caroline du Nord, auteur de l'excellent textbook «Orthopedic clinical examination», et qui vient de terminer son PhD (félicitations!) sous la supervision de Kristian Thorborg (Danemark), dans lequel il s'est intéressé à la validité des tests cliniques les plus fréquemment utilisés dans l'examen de la hanche. Nous avons tendance à penser que les tests «spéciaux» nous apportent des informations détaillées sur une structure ou une pathologie particulière, or de nombreuses études nous confrontent à cette même fausse impression dans le cadre des tests de l'épaule.

Dans cet article, le Dr Reiman décortique ce que nous savons des tests d'instabilité de la hanche, et les conclusions ne sont pas très différentes. Certains tests nous aident à confirmer une pathologie (spécificité plus élevée que sensibilité), mais ne devraient pas être considérés comme déterminants.

A #SportSuisse2018, il nous a présenté son travail de PhD sur les tests de conflit fémoro-acétabulaire, dont les résultats ne sont pas différents de l'instabilité. Nous nous devons de rester prudents dans l'interprétation que nous faisons des tests cliniques positifs. Premièrement, les tests doivent être standardisés et exécutés correctement. Deuxièmement, le clinicien doit comprendre quand un test peut être considéré positif: recherche-t-on une douleur (celle de la plainte principale ou une douleur différente?), un clic ou une réduction des amplitudes de mouvement? Tous les tests ne recherchent pas la même chose. Troisièmement, le clinicien doit reconnaître la validité de chaque test.

Une façon de regarder ceci serait de dire que les gestes de l'examen clinique doivent être choisis et exécutés adéquatement, tandis que les résultats de ces tests ne peuvent être interprétés que dans le contexte de l'anamnèse, du cumul des tests, de l'imagerie disponible et de l'expérience du clinicien. Nous parlons bien là de l'art du travail clinique, mais prenons garde à ne pas verser dans le «flou artistique».

Mots clés: hip, clinical examination, tests, groin, symptoms

Clinical examination is one of the main skill that clinicians acquire through training and experience, and its contribution to diagnosis is a key addition to history taking. Mike Reiman is a physical therapist, author of the excellent textbook «Orthopedic clinical examination», who just conpleted his PhD (congrats!) under the supervision of Kristian Thorborg (Denmark), looking at the validity of the most frequently used clinical examination tests around the hip area. We tend to think that "specialized" tests have great significance for the examination of a particular structure of pathology, yet as we have already learned from multiple studies on this very question around the shoulder examination tests, this is deceptive.
In this article, Dr Reiman looks at what we know for hip instability tests, and the conclusion is not very different. Some tests can help in ruling in a pathology (higher specificity than sensibility), but should by no means be considered decisive.

At #SportSuisse2018, he presented his PhD work on femoro-acetabular impingement tests, and the findings are not dissimilar to this article. We should be very careful with the interpretation we make of positive clinical tests. First, the tests should be properly standardized and executed. Second, the clinician must understand when a test is to be interpreted as positive: do we look for pain (reproduces the patient's complaint or a different pain?), clicking or limitation in range of motion? Not all tests look for the same thing. Third, the clinician must acknowledge the validity of each test.

One way to look at it is, that the act of clinical examination must be executed and chosen wisely, whilst the results of the tests can only be interpreted in the context of the history, the aggregate of tests, the additional imaging when advisable and the experience of the clinician. This is the art of clinical work informed by science, but let's not overstate our findings too "artistically".

Mike Reiman

Introduction

Patients with hip dysplasia and instability are reported to have similar patient presentations as those with femoroacetabular impingement (FAI) syndrome. [1,2] While other non-arthritic hip related pathologies, namely FAI syndrome, are undergoing unprecedented growth in surgical treatment [3,4] and outcome reporting,4 hip dysplasia and instability continue to be poorly understood and reported. [1,2]

Developmental dysplasia of the hip (DDH) is reported to be involved in 20 to 40% of patients with hip osteoarthritis, [5–7] demonstrating a stronger relationship with osteoarthritis than FAI syndrome. Despite widespread screening for dysplasia at birth and infancy, several cases are not diagnosed until adulthood. [8,9] There has been a 40-fold variation in prevalence reporting of DDH in part due to variable definitions. [8]

The diagnosis of acetabular dysplasia in the adult has traditionally focused on radiography, with a lateral center-edge angle measurement of <20 to 25^0 and/or anterior center-edge angle of $<20^0$ as primary definitions. [1] The clinical diagnosis of dysplasia has traditionally focused on described risk factors, specifically related to developmental dysplasia of the hip (e.g. female sex, history of low birth weight and breech birth, family history). [10–12] The clinical diagnosis of hip dysplasia and instability is challenging due to a lack of specific signs and symptoms and a typical subtle presentation. [13] Hip dysplasia is suggested as a condition of instability in the hip; [14] an extra-physiological hip motion causing pain and impairing function. [15] Hip instability is a term encompassing a broad range of causes from trauma, generalized ligamentous laxity, collagen disorders, bone abnormalities and soft tissue laxity. [16] Currently there are no established objective or radiological signs specific to hip instability. [17]

A principle purpose of the diagnostic process is to provide the practicing clinician with enough information to make optimal decisions for subsequent treatment. [18] Therefore, the purpose of this paper is to report the current evidence regarding the clinical and radiographic diagnosis of hip dysplasia and instability.

Clinical Examination

The current physical examination procedures for the diagnosis of hip dysplasia and/or instability are reported as 'instability' tests; although it is worth repeating that hip dysplasia, by nature, is a condition of hip instability. [14]

There have been a few reports, mostly in conference presentations, of various physical examination tests for hip instability. The following physical examination tests for hip instability are divided into tests with and without reported diagnostic accuracy.

A. Physical Examination Tests without Reported Diagnostic Accuracy

A1. Dial Test

Movement: With the hip in a neutral flexion/extension and abduction/adduction position, the clinician grasps the patient's lower extremity (LE) at the femur and tibia and is passively rolled into full internal rotation. The LE is released and allowed to externally rotate.
Assessment: Evaluate side-to-side range-of-motion (ROM) differences and for the presence of mechanical clicking. Patients with passive external rotation (ER) greater than 45° are considered to have a positive (+) test.
Diagnostic Accuracy: Not reported.

A2. Log Roll Test

Movement: With the hip in a neutral flexion/extension and abduction/adduction position, the patient's LE is passively rolled into full IR and ER.
Assessment: Evaluate side-to-side ROM differences and clicking. A click reproduced during the test is suggestive of labral tear, while increased ER ROM may indicate iliofemoral ligament laxity.
Diagnostic Accuracy: Not reported.

B. Physical Examination Tests with Reported Diagnostic Accuracy

Two current studies report enough information to provide the reader with the capability of calculating the diagnostic accuracy of various physical examination tests for this diagnosis. [19,20] The physical examination tests reported in these studies are the following:

B1. Abduction-Hyperextension-External Rotation (AB-HEER) Test

Movement: Patient is in the lateral decubitus position with the affected hip on top of the non-affected hip. The clinician then abducts the hip to 30 to 45 degrees, extends and ER the hip while providing an anteriorly directed force to the posterior greater trochanter.
Assessment: A (+) test is reproduction of the patient's anterior hip pain.
Interpretation: [19]

- Sensitivity (SN) 80.6, specificity (SP) 89.4, positive likelihood ratio (+LR) 7.6, negative likelihood ratio (–LR) 0.22.
- *A moderate* shift in post-test probability was determined with a positive (+) test (helping to rule in the diagnosis) and a *small* shift in post-test probability was determined with a negative (–) test (helping to rule out the diagnosis) in one study of low quality.

B2. Prone Instability Test

Movement: Patient is in prone with legs relaxed. The hip is ER'd, while the clinician applies a downward force on the posterior greater trochanter.
Assessment: Reproduction of anterior hip pain is consistent with a (+) result for instability.
Interpretation: [19]

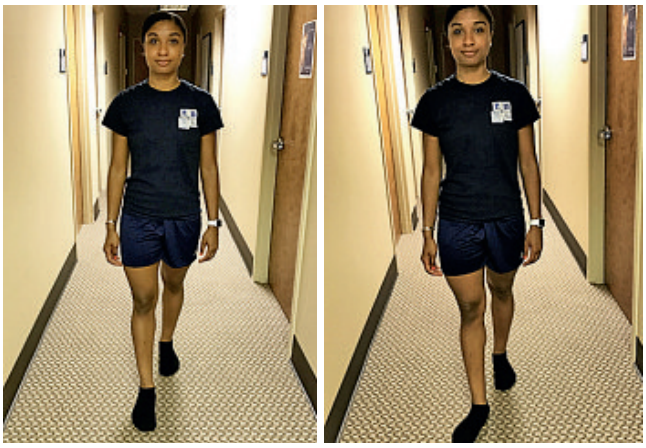
- SN 34, SP 98, +LR 15.9, –LR 0.68
- A *large* shift in post-test probability was determined with a positive (+) test (helping to rule in the diagnosis) and a *very small* shift in post-test probability was determined with a negative (–) test (helping to rule out the diagnosis) in one study of low quality.

B3. Hyperextension-External Rotation (HEER) Test

Movement: Patient is supine at the foot of the table with the LE's hanging of the edge of the table. The contralateral leg is held in full flexion with the knee to the chest by the patient. The clinician applies an anteriorly directed force at the hip by performing hyperextension and ER of the hip to be assessed.
Assessment: A (+) test is reproduction of the patient's anterior hip pain.
Interpretation: [19]

- SN 71, SP 85, +LR 4.8, –LR 0.34
- A *small* shift in post-test probability was determined with a positive (+) test (helping to rule in the diagnosis) and a *small* shift in post-test probability was determined with a negative (–) test (helping to rule out the diagnosis) in one study of low quality.

B4. Foot Progression Angle Walking (FPAW) Test



Movement: The patient is instructed to ambulate at their baseline functional pattern for approximately 20 feet. During this baseline gait assessment, categorization of their ipsilateral foot progression angle was characterized as neutral, out-toeing, or in-toeing. The patient is then instructed to IR their foot 15^0 from their baseline pattern. The gait assessment is then repeated. The patient is to maintain the equivalent abduction/adduction of the LE with the assigned rotation. Measurements were standardized by having patients stand on a blank sheet of paper, measuring 15^0 with a goniometer, and marking the location for their reference.
Assessment: (+) test was the presence of hip pain during testing or exacerbation of symptoms if pain was present at their baseline gait assessment.
Interpretation: [20]

- SN 34, SP 98, +LR 15.9, –LR 0.68
- A *small* shift in post-test probability was determined with a positive (+) test (helping to rule in the diagnosis) and a *small* shift in post-test probability was determined with a negative (–) test (helping to rule out the diagnosis) in one study of high quality.

B5. Flexion-Abduction-External Rotation (FABER) Test

Movement: The patient is supine with LE's relaxed. The clinician moves the LE to be assessed into the combined motions of hip flexion, abduction and ER; placing (if possible) the foot of the LE to be assessed just superior and lateral to the patella of the non-assessed LE.

Assessment: (+) test was the presence of hip pain during testing.
Interpretation: [20]

- SN 54, SP 90, +LR 5.4, –LR 0.5
- A *moderate* shift in post-test probability was determined with a positive (+) test (helping to rule in the diagnosis) and a *small* shift in post-test probability was determined with a negative (–) test (helping to rule out the diagnosis) in one study of high quality.

CONCLUSION

Currently, the physical examination is limited to a few tests of reported diagnostic accuracy. The reporting studies examining these tests generally report these tests as having a little greater capacity to help rule in the diagnosis of hip instability than to rule it out. The clinician is cautioned regarding the interpretation of the findings in these studies due to these studies demonstrating some risk of bias and they were single studies reporting on the various clinical tests. Additional studies are suggested for determination of diagnostic accuracy of these clinical tests.

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